

FASTA
SEQUENCE LISTING

<110> Chen, Yih-Tai
Cao, Longguang

<120> A synthetic DNA encoding an orange seapen-derived green fluorescent protein
with codon preference of mammalian expression systems and biosensors

<130> 41856-5

<160> 27

<170> PatentIn version 3.1

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<211> 1482

<212> DNA

<213> Ptilosarcus gurneyi

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| agcgccaagg | ccagcgtgga | gggcacgtg | aacaaccacg | tgttcagcat | ggagggcttc | 120 |
| ggcaagggca | acgtgctgtt | cggaaccag | ctgatgcaga | tccgggtgac | caagggcggc | 180 |
| cctctgccct | tcgccttcga | catcgtgagc | atgccttcc | agtacggcaa | ccggaccttc | 240 |
| accaagtatc | ccgacgacat | cgccgactac | ttcgtgcaga | gcttccctgc | cggcttcttc | 300 |
| tacgagcgga | acctgcggtt | cgaggacggc | gccatcgtgg | acatccggag | cgacatcagc | 360 |
| ctggaggacg | acaagttcca | ctacaaggtg | gagtaccgcg | gcaacggctt | ccctagcaac | 420 |
| ggccctgtga | tgcagaaggc | catcctgggc | atggagccca | gcttcgaggt | ggtgtacatg | 480 |

Sequence

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| aacagcggcg | tgctgggtggg | cgaggtggac | ctggtgtaca | agctggagag | cggaactac | 540 |
| tacagctgcc | acatgaagac | cttctaccgg | agcaagggcg | gcgtgaagga | gttccctgag | 600 |
| tacctattca | tccaccaccg | gctggagaag | aactacgtgg | aggagggcag | cttcgtggag | 660 |
| cagcacgaga | ccgccatcgc | ccagctgacc | accatcggca | agcctctggg | cagcctgcac | 720 |
| gagtgggtgt | aaagcggccg | caagcttgcc | accatggtga | accggaacgt | gctgaagaac | 780 |
| accggcctga | aggagatcat | gagcgccaag | gccagcgtgg | agggcatcgt | gaacaaccac | 840 |
| gtgttcagca | tggagggcctt | cggcaagggc | aacgtgctgt | tggcaacca | gctgatgcag | 900 |
| atccgggtga | caaagggcgg | ccctctgccc | ttgccttcg | acatcgtgag | catcgccttc | 960 |
| cagtacggca | accggacctt | caccaagtat | cccgacgaca | tgcgcgacta | cttcgtgcag | 1020 |
| agcttccctg | cgggttcttt | ctacgagcgg | aacctgcggt | togaggacgg | cgccatcgtg | 1080 |
| gacatccgga | gcgacatcag | cctggaggac | gacaagttcc | actacaaggt | ggagtaccgc | 1140 |
| ggcaacggct | tccctagcaa | cggccctgtg | atgcagaagg | ccatccctggg | catggagccc | 1200 |
| agcttcgagg | tggtgtacat | gaacagcggc | gtgctggtgg | gcgaggtgga | cctgggtgtac | 1260 |
| aagctggaga | gcggcaacta | ctacagctgc | cacatgaaga | ccttctaccg | gagcaagggc | 1320 |
| ggcgtgaagg | agttccctga | gtacctattc | atccaccacc | ggctggagaa | gaactacgtg | 1380 |
| gaggagggca | gcttcgttga | gcagcacgag | accgccatcg | cccagctgac | caccatcggc | 1440 |
| aagcctctgg | gcagcctgca | cgagtgggtg | taaagcggcc | gc | | 1482 |

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| Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met 35 40 45 | |
| Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile 50 55 60 | |
| Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro 65 70 75 80 | |
| Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe 85 90 95 | |
| Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg 100 105 110 | |

PTILSARCA GURNEYI

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
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Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
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Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val
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Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Val Lys
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
195 200 205

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Leu Thr Thr Ile Gly Lys Pro Leu Gly Ser Leu His Glu Trp Val
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PTILSARCUS GURNEYI

<212> PRT

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35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
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Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
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Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
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Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
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Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val
145 150 155 160

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys
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Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
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<213> Ptilosarcus gurneyi

<400> 4

Gly Leu Lys Glu Ile Met Ser Ala Lys Ala Ser Val Glu Gly Ile Val
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PROTEIN DATA

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| | | 20 | | | | | 25 | | | | | | 30 | | | |
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| Phe | Gly | Asn | Gln | Leu | Met | Gln | Ile | Arg | Val | Thr | Lys | Gly | Gly | Pro | Leu | |
| | | 35 | | | | | 40 | | | | | | 45 | | | |
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35

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Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro Asp
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Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe Tyr
85 90 95

Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg Ser
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Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr Arg
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Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile Leu
130 135 140

Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val Leu
145 150 155 160

Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr
165 170 175

Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys Glu
180 185 190

Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr Val
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Thr Thr Ile Gly Lys Pro Leu Gly Ser Leu His Glu Trp Val
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| 50 | | | |
| Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro Asp Asp | 70 | 75 | 80 |
| 65 | | | |
| Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe Tyr Glu | 85 | 90 | 95 |
| | | | |
| Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg Ser Asp | 100 | 105 | 110 |
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| Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr Arg Gly | 115 | 120 | 125 |
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| Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile Leu Gly | 130 | 135 | 140 |
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| Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val Leu Val | 145 | 150 | 155 |
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| Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr Ser | 165 | 170 | 175 |
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| Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys Glu Phe | 180 | 185 | 190 |

PTILSARCUS GURNEYI

Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr Val Glu
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Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile Val Ser Ile
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PTILSARCA

Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro Asp Asp Ile
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Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe Tyr Glu Arg
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Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg Ser Asp Ile
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Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr Arg Gly Asn
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Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile Leu Gly Met
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Glu Pro Ser Phe Glu Val Tyr Met Asn Ser Gly Val Leu Val Gly
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Glu Val Asp Leu Val Tyr Lys Lys Leu Glu Ser Gly Asn Tyr Tyr Ser Cys
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His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys Glu Phe Pro
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Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr Val Glu Glu
195 200 205

PTILSARCUS GURNEYI

Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln Leu Thr Thr
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Ile Gly Lys Pro Leu Gly Ser Leu His Glu Trp Val
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Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile Val Ser Ile Ala
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Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro Asp Asp Ile Ala
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Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe Tyr Glu Arg Asn
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Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg Ser Asp Ile Ser
100 105 110

Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr Arg Gly Asn Gly
115 120 125

Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile Leu Gly Met Glu
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Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val Leu Val Gly Glu
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Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr Ser Cys His
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Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr Val Glu Glu Gly
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<213> Ptilosarcus gurneyi

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Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile Val Ser Ile Ala Phe
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Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro Asp Asp Ile Ala Asp
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Tyr Phe Val Gln Ser Phe Phe Pro Ala Gly Phe Phe Tyr Glu Arg Asn Leu

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| Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr Arg Gly Asn Gly Phe | 115 | 120 | 125 |
| Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile Leu Gly Met Glu Pro | 130 | 135 | 140 |
| Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val Leu Val Gly Glu Val | 145 | 150 | 155 |
| Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr Ser Cys His Met | 165 | 170 | 175 |
| Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys Glu Phe Pro Glu Tyr | 180 | 185 | 190 |
| His Phe Ile His His Arg Leu Glu Lys Thr Tyr Val Glu Glu Gly Ser | 195 | 200 | 205 |
| Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln Leu Thr Thr Ile Gly | 210 | 215 | 220 |

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

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Lys Pro Leu Gly Ser Leu His Glu Trp Val
225      230

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Glu Gly Ile Val Asn Asn His Val Phe Ser Met Glu Gly Phe Gly Lys
20      25      30

Gly Asn Val Leu Phe Gly Asn Gln Leu Met Gln Ile Arg Val Thr Lys
35      40      45

Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile Val Ser Ile Ala Phe Gln
50      55      60

Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro Asp Asp Ile Ala Asp Tyr
65      70      75      80

Phe Val Gln Ser Phe Pro Ala Gly Phe Phe Tyr Glu Arg Asn Leu Arg
85      90      95

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Phe Glu Asp Gly Ala Ile Val Asp Ile Arg Ser Asp Ile Ser Leu Glu
100 105 110

Asp Asp Lys Phe His Tyr Lys Val Glu Tyr Arg Gly Asn Gly Phe Pro
115 120 125

Ser Asn Gly Pro Val Met Gln Lys Ala Ile Leu Gly Met Glu Pro Ser
130 135 140

Phe Glu Val Val Tyr Met Asn Ser Gly Val Leu Val Gly Glu Val Asp
145 150 155 160

Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr Ser Cys His Met Lys
165 170 175

Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys Glu Phe Pro Glu Tyr His
180 185 190

Phe Ile His His Arg Leu Glu Lys Thr Tyr Val Glu Glu Gly Ser Phe
195 200 205

Val Glu Gln His Glu Thr Ala Ile Ala Gln Leu Thr Thr Ile Gly Lys
210 215 220

Pro Leu Gly Ser Leu His Glu Trp Val
225 230

PTILSARCA

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Gly Ile Val Asn Asn His Val Phe Ser Met Glu Gly Phe Gly Lys Gly
20     25     30

Asn Val Leu Phe Gly Asn Gln Leu Met Gln Ile Arg Val Thr Lys Gly
35     40     45

Gly Pro Leu Pro Phe Ala Phe Asp Ile Val Ser Ile Ala Phe Gln Tyr
50     55     60

Gly Asn Arg Thr Phe Thr Lys Tyr Pro Asp Asp Ile Ala Asp Tyr Phe
65     70     75     80

Val Gln Ser Phe Pro Ala Gly Phe Phe Tyr Glu Arg Asn Leu Arg Phe
85     90     95

Glu Asp Gly Ala Ile Val Asp Ile Arg Ser Asp Ile Ser Leu Glu Asp
100    105    110

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PTILSAR

Asp Lys Phe His Tyr Lys Val Glu Tyr Arg Gly Asn Gly Phe Pro Ser
115 120 125

Asn Gly Pro Val Met Gln Lys Ala Ile Leu Gly Met Glu Pro Ser Phe
130 135 140

Glu Val Val Tyr Met Asn Ser Gly Val Leu Val Gly Glu Val Asp Leu
145 150 155 160

Val Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr Ser Cys His Met Lys Thr
165 170 175

Phe Tyr Arg Ser Lys Gly Gly Val Lys Glu Phe Pro Glu Tyr His Phe
180 185 190

Ile His His Arg Leu Glu Lys Thr Tyr Val Glu Glu Gly Ser Phe Val
195 200 205

Glu Gln His Glu Thr Ala Ile Ala Gln Leu Thr Thr Ile Gly Lys Pro
210 215 220

Leu Gly Ser Leu His Glu Trp Val
225 230

<210> 12
<211> 231

Lys Phe His Tyr Lys Val Glu Tyr Arg Gly Asn Gly Phe Pro Ser Asn
115 120 125

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Gly Pro Val Met Gln Lys Ala Ile Leu Gly Met Glu Pro Ser Phe Glu
130 135 140

Val Val Tyr Met Asn Ser Gly Val Leu Val Gly Glu Val Asp Leu Val
145 150 155 160

Tyr Lys Leu Glu Ser Gly Asn Tyr Tyr Ser Cys His Met Lys Thr Phe
165 170 175

Tyr Arg Ser Lys Gly Gly Val Lys Glu Phe Pro Glu Tyr His Phe Ile
180 185 190

His His Arg Leu Glu Lys Thr Tyr Val Glu Glu Gly Ser Phe Val Glu
195 200 205

Gln His Glu Thr Ala Ile Ala Gln Leu Thr Thr Ile Gly Lys Pro Leu
210 215 220

Gly Ser Leu His Glu Trp Val
225 230

<210> 13
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[illegible]

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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|

Ar

130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val
145 150 155 160

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met
35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
65 70 75 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
85 90 95

Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
115 120 125

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
130 135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val
145 150 155 160

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
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Val Glu Glu Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln
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Leu
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Met Val Asn Arg Asn Val Leu Lys Asn Thr Gly Leu Lys Glu Ile Met
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Ser Ala Lys Ala Ser Val Glu Gly Ile Val Asn Asn His Val Phe Ser
20 25 30

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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met
  35      40      45
Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
  50      55      60
Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
  65      70      75      80
Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
  85      90      95
Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
 100      105      110
Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
 115      120      125
Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
 130      135      140
Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val
 145      150      155      160
Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
 165      170      175

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PTILSARCUS GURNEYI

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
195 200 205

Val Glu Glu Gly Ser Phe Val Glu Glu His Glu Thr Ala Ile Ala Gln
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Leu Thr
225

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Ser Ala Lys Ala Ser Val Glu Gly Ile Val Asn Asn His Val Phe Ser
20 25 30

Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met
35 40 45

Sequence

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
65 70 75 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
85 90 95

Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
115 120 125

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
130 135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val
145 150 155 160

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Val Lys
180 185 190

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
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Val Glu Glu Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln
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Leu Thr Thr
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Ser Ala Lys Ala Ser Val Glu Gly Ile Val Asn Asn His Val Phe Ser
20 25 30

Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met
35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
50 55 60

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro 80
65 70 75

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe 95
85 90

Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg 110
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr 125
115 120

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile 140
130 135

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val 160
145 150 155

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr 175
165 170

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys 190
180 185

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr

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200 205

Val Glu Glu Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln
210 215 220

Leu Thr Thr Ile
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Ser Ala Lys Ala Ser Val Glu Gly Ile Val Asn Asn His Val Phe Ser
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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met
35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro

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| 65 | 70 | 75 | 80 |
| Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe | 85 | 90 | 95 |
| Tyr Glu Arg Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg | 100 | 105 | 110 |
| Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr | 115 | 120 | 125 |
| Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile | 130 | 135 | 140 |
| Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val | 145 | 150 | 155 |
| Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr | 160 | 165 | 170 |
| Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys | 175 | 180 | 185 |
| Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr | 190 | 195 | 200 |
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Leu Thr Thr Ile Gly
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Ser Ala Lys Ala Ser Val Glu Gly Ile Val Asn Asn His Val Phe Ser
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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met
35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
65 70 75 80

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|----|
| Asp | Asp | Ile | Ala | Asp | Tyr | Phe | Val | Gln | Ser | Phe | Pro | Ala | Gly | Phe | Phe | 95 |
| | | | | 85 | | | | | 90 | | | | | | | |
| Tyr | Glu | Arg | Asn | Leu | Arg | Phe | Glu | Asp | Gly | Ala | Ile | Val | Asp | Ile | Arg | |
| | | | | 100 | | | | 105 | | | | | 110 | | | |
| Ser | Asp | Ile | Ser | Leu | Glu | Asp | Asp | Lys | Phe | His | Tyr | Lys | Val | Glu | Tyr | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| Arg | Gly | Asn | Gly | Phe | Pro | Ser | Asn | Gly | Pro | Val | Met | Gln | Lys | Ala | Ile | |
| | | 130 | | | | 135 | | | | 140 | | | | | | |
| Leu | Gly | Met | Glu | Pro | Ser | Phe | Glu | Val | Val | Tyr | Met | Asn | Ser | Gly | Val | |
| | | 145 | | | 150 | | | | | 155 | | | | | 160 | |
| Leu | Val | Gly | Glu | Val | Asp | Leu | Val | Tyr | Lys | Leu | Glu | Ser | Gly | Asn | Tyr | |
| | | | 165 | | | | | 170 | | | | | | 175 | | |
| Tyr | Ser | Cys | His | Met | Lys | Thr | Phe | Tyr | Arg | Ser | Lys | Gly | Gly | Val | Lys | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Glu | Phe | Pro | Glu | Tyr | His | Phe | Ile | His | His | Arg | Ileu | Glu | Lys | Thr | Tyr | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| Val | Glu | Glu | Gly | Ser | Phe | Val | Glu | Gln | His | Glu | Thr | Ala | Ile | Ala | Gln | |
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PTILSARCA GURNEYI

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35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
65 70 75 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
85 90 95

PTILSARCUS GURNEYI

Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
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Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
115 120 125

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
130 135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val
145 150 155 160

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Val Lys
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
195 200 205

Val Glu Glu Gly Ser Phe Val Glu Glu His Glu Thr Ala Ile Ala Gln
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Leu Thr Thr Ile Gly Lys Pro
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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met
35     40     45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
50     55     60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
65     70     75     80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
85     90     95

Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
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PTILSARCUS GURNEYI

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
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Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
130 135 140
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145 150 155 160
Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165 170 175
Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Val Lys
180 185 190
Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
195 200 205
Val Glu Glu Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln
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Leu Thr Thr Ile Gly Lys Pro Leu
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PTILSARCUS GURNEYI

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Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
65 70 75 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
85 90 95

Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr

115
120
125

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
130 135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val
145 150 155 160

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
195 200 205

Val Glu Glu Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln
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Leu Thr Thr Ile Gly Lys Pro Leu Gly
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Ser Ala Lys Ala Ser Val Glu Gly Ile Val Asn Asn His Val Phe Ser
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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met
35 40 45

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
50 55 60

Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
65 70 75 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
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Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
115 120 125

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
130 135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val
145 150 155 160

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
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Val Glu Glu Gly Ser Phe Val Glu Glu His Glu Thr Ala Ile Ala Gln
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Leu Thr Thr Ile Gly Lys Pro Leu Gly Ser
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Ser Ala Lys Ala Ser Val Glu Gly Ile Val Asn Asn His Val Phe Ser
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Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
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Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
65 70 75 80

Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
85 90 95

Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
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Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
130 135 140

Sequence

Leu Gly Met Glu Pro Ser Phe Glu Val Tyr Met Asn Ser Gly Val
145 150 155 160

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
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Val Glu Glu Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln
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Met Glu Gly Phe Gly Lys Gly Asn Val Leu Phe Gly Asn Gln Leu Met
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Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
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| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Ser | Ile | Ala | Phe | Gln | Tyr | Gly | Asn | Arg | Thr | Phe | Thr | Lys | Tyr |
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Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
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Tyr Glu Arg Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
100 105 110

Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
115 120 125

Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
130 135 140

Leu Gly Met Glu Pro Ser Phe Glu Val Tyr Met Asn Ser Gly Val
145 150 155 160

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
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Val Glu Glu Gly Ser Phe Val Glu Glu His Glu Thr Ala Ile Ala Gln
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Leu Thr Thr Ile Gly Lys Pro Leu Gly Ser Leu His
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Ser Ala Lys Ala Ser Val Glu Gly Ile Val Asn Asn His Val Phe Ser
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Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
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Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
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Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
85 90 95
Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
100 105 110
Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
115 120 125
Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
130 135 140
Leu Gly Met Glu Pro Ser Phe Glu Val Val Tyr Met Asn Ser Gly Val
145 150 155 160
Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr

165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Val Lys
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
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Val Glu Glu Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln
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40
45

35

Gln Ile Arg Val Thr Lys Gly Gly Pro Leu Pro Phe Ala Phe Asp Ile
50 55 60
Val Ser Ile Ala Phe Gln Tyr Gly Asn Arg Thr Phe Thr Lys Tyr Pro
65 70 75 80
Asp Asp Ile Ala Asp Tyr Phe Val Gln Ser Phe Pro Ala Gly Phe Phe
85 90 95
Tyr Glu Arg Asn Leu Arg Phe Glu Asp Gly Ala Ile Val Asp Ile Arg
100 105 110
Ser Asp Ile Ser Leu Glu Asp Asp Lys Phe His Tyr Lys Val Glu Tyr
115 120 125
Arg Gly Asn Gly Phe Pro Ser Asn Gly Pro Val Met Gln Lys Ala Ile
130 135 140
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145 150 155 160
Leu Val Gly Glu Val Asp Leu Val Tyr Lys Leu Glu Ser Gly Asn Tyr
165 170 175

Tyr Ser Cys His Met Lys Thr Phe Tyr Arg Ser Lys Gly Gly Val Lys
180 185 190

Glu Phe Pro Glu Tyr His Phe Ile His His Arg Leu Glu Lys Thr Tyr
195 200 205

Val Glu Glu Gly Ser Phe Val Glu Gln His Glu Thr Ala Ile Ala Gln
210 215 220

Leu Thr Thr Ile Gly Lys Pro Leu Gly Ser Leu His Glu Trp
225 230 235